Space Weather Forecast

Issued on Tuesday 21 January 2025 at 13:13 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Moderate class flares likely with a slight chance of X-class (Strong) flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate, with a peak moderate flare at 21/1039 UTC from the region of AR3967. There are ten sunspot regions on the Earth-facing disc with the departure of AR3968. AR3961 remains the largest sunspot group, and the magnetic configuration of the sunspot is complex. AR3964 and AR3959 are both moderately sized spots, neither of which have shown any significant change in recent hours. Confidence in the magnetic configuration of AR3968 is low however, given increased foreshortening as it approaches the western horizon. All remaining spots are small and have shown little change, though a lack of recent imagery gives lower confidence.

An apparent coronal mass ejection (CME) associated with the recent Moderate flare is under review pending imagery.

Solar Wind / Geomagnetic Activity: Ongoing fast winds were observed. Solar wind speed saw a slight decline from strong to elevated levels, reaching 650-550km/s. The Interplanetary Magnetic field, Bt, was Weak and declining, with the north-south component, Bz, also Weak, with no single orientation favoured. Geomagnetic activity was Quiet to Active (Kp2-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at Background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast, with isolated Moderate-class flares likely. There is a slight chance of Strong flares.

Solar Wind / Geomagnetic Activity: There are no CME arrivals currently forecast for Earth, however a glancing impact from a CME on 18 Jan cannot be completely ruled out early day 1 (21 Jan). A CME awaiting analysis also brings a risk towards the end of the period. Largely Quiet to Unsettled geomagnetic activity is expected, with a reducing chance of Active intervals through the period as the current elevated solar winds steadily ease. There is a slight chance of G1/Minor geomagnetic storm intervals however, these most likely early day 1 (21 Jan), and into day 4 (24 Jan) if any CME impacts occur.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at Background with no Solar Radiation Storms occurring. However, there is a slight chance of this rising in response to any significant flares that occur.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	5	20
Strong	G3	No	1	1	1	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	70	70	70	70
Very Active	R3-R5 (X Class)	No	15	15	15	15

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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